
Photo courtesy of U.S. Department of Homeland Security

R-TECH NEWSLETTER
The Newsletter of the First Responder Technologies Program

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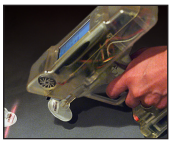

This Newsletter discusses technologies of interest to first responders that have received funding, in part, from the Federal government. Mention of these technologies should not be construed as an endorsement of either the technology, or the entity producing it, by the Federal government.

ACTIONS SPEAK LOUDER THAN WORDS

Physiological Sensors Help Security Screeners Improve Travel Safety

Photo courtesy of U.S. Department of Homeland Security

Security screeners are trained to observe people passing through checkpoints for behavioral signs that indicate harmful intent, just one of many complex and difficult tasks they are asked to perform. The Human Factors division of the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) is developing an innovative screening system to help screeners better determine who deserves a closer look.


Photo courtesy of U.S. Department of Homeland Security

The Future Attribute Screening Technology (FAST) System uses a suite of sensors to measure physiological changes in subjects as they move closer to the security checkpoint. The system looks for involuntary responses that indicate a person is under stress or potentially violent. "Even though terrorists are trained to be cool under pressure, they can't control everything," said John Verrico, a spokesman for S&T. The system currently uses thermal imagers to measure changes in facial temperature and skin presentation and BioLIDAR (Light Detection and Ranging) to measure a subject's heart rate and respiration. Future modifications may include a sensor to measure pupil dilation and eye movement.

People identified by the FAST System as requiring a closer look can be taken to a secondary screening area and asked a series of questions. For this questioning, FAST designers hope to provide microfacial expression technology to measure minute changes in the subject's face

Actions Speak (continued)

during questioning. These changes, too small for humans to detect, would help indicate if someone is being deceptive.

The project is in the proof-of-concept phase, an early stage of a five-year timeline. Each sensor must be independently validated to determine if "we can read what we think we're reading, and that it means what we think it means," said Verrico. Laboratory protocol testing is being conducted by Draper Laboratory in Cambridge, Massachusetts, and early tests have shown enough promise to warrant continuation of the project.

DHS wants the system to be transportable for use at any sort of event where a checkpoint would be required, such as a stadium event. With that in mind, the current system has been incorporated into a portable laboratory system set up inside of tractor trailers that contain an area for screening event attendees, a command unit where operations can be managed, and an area for on-site data processing and analysis equipment.

Photo courtesy of U.S. Department of Homeland Security

For more information visit the S&T Human Factors Behavioral Sciences Research Webpage at www.dhs.gov/xres/programs/gc_1218480185439.shtm.

Photo courtesy of U.S. Department of Homeland Security

U.S. DEPARTMENT OF HOMELAND SECURITY TO CONDUCT TEST OF INDOOR 3-D LOCATION SYSTEM

One of the top technology priorities of the fire service, year after year, is an indoor three-dimensional (3-D) location system for first responders. Vendors face considerable challenges in developing such devices. These systems must be reliable in a variety of situations and types of buildings, and they need to be made available as quickly as possible to save lives in the line of duty. Chief Robert Ingram of the New York City Fire Department and chair of the InterAgency Board for Interoperability (IAB) noted that "if even one life could be saved by this technology, it would be of benefit." To speed the systems' development, the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) is funding a demonstration and evaluation event where vendors can showcase their systems and receive objective feedback from DHS and first responders to assist development efforts. The goal is to test the 3-D location systems in standard, real-world situations. This event will be conducted in Massachusetts, as early as March 2009.

Photo courtesy of Eastern Kentucky University, Justice & Safety Center

The demonstration and evaluation event is a team effort between DHS, the Worcester Polytechnic Institute (WPI), and the U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC). "The tests will be designed to provide DHS with a clear picture of the status of current technology, the hurdles that remain and hopefully illuminate the shortest path to meeting this important need of first responders," said David Cyganski, Professor of Electronics and Computer Engineering in the WPI Robotics Engineering Program.

Tests will be conducted in the greater Boston area in a range of building types, including structures with multiple stories and subterranean sections, and may also include an outdoor scenario for law enforcement. Organizers are collaborating with the Massachusetts Fire Marshal and Massachusetts law enforcement agencies to determine appropriate sites. "There

3-D Location Systems (continued)

is a strong focus to make the scenarios as real as possible and to get first responders' input," said Scott Ullery, Project Officer at NSRDEC.

WPI will provide the technical expertise for developing the selection criteria, the actual test and evaluation plan, and oversee testing. NSRDEC will select the participants and choose and organize the actual test sites. "Stakeholders with experience and expertise in the area will review the team's assessment plans and will provide input at different stages," said Ullery.

After the testing, each vendor will receive a comprehensive report that will detail what elements of the system work and under what conditions. DHS will publish a public summary report about the overall technological status of location systems and the implications of the tests regarding the maturity of these systems. DHS hopes that this testing will identify highly promising technologies and help steer future investments.

GET YOUR HANDS OFF

New Sampling Device Increases Safety, Accuracy, Efficiency

When first responders take samples for forensic investigation or for detection of hazardous substances, they must be diligent in collection and record keeping. Transporting samples from the field to the laboratory can be difficult and documenting details about the sample is often tedious. Furthermore, laboratory databases are susceptible to delays and errors when information is entered.


Photo courtesy of Los Alamos National Laboratory

The Hands-Off Sampling Device, developed by the Los Alamos National Laboratory (LANL) National Security Technology team, streamlines and automates the evidence collection process for all types of crime scenes and hazardous materials incidents. The device can swab samples, filter air, and collect and track any solid, liquid, or gaseous substance. To minimize cross-contamination when collecting multiple samples, particularly in forensic investigations, the LANL team equipped the device with a bar-coded sampling disc that can collect all types of samples – forensic evidence or chemical, biological, or radiological agents. "You don't have to touch the sampling disc or push it on by hand. When you're done, you pull the trigger, and the device ejects the disc into an evidence bag, so the disc never has to be touched," said Torsten Staab, lead inventor and LANL team leader. In addition

Hands Off (continued)

to reducing cross-contamination, this feature also minimizes responders' risk of exposure to harmful substances.

The device also has an electronic touch screen that allows first responders to send information about the sample wirelessly from the field or to upload it directly when returning the device to the lab. "The lab will know ahead of time how many and what type of samples to expect. The lab can scan in the bar code from the sampling disc and instantly be provided with all the collection information about the sample," said Staab.

The LANL team developed the device in response to critical technology needs identified by first responders, including forensics, law enforcement, and anti-terrorism squads. The Federal Bureau of Investigation's (FBI) Hazardous Materials Response Team provided LANL with a list of the top ten most useful features for a device of this kind. "The FBI wanted to record the location where the sample was taken and rapidly map the location into a 3-D state in case it is necessary to come back to the exact location," said Staab. To fulfill that request, the device contains a global positioning system (GPS) with a sonar sensor as a backup positioning system.

The Hands-Off Sampling Device reduces the number of documentation tools first responders must carry in the field. First responders currently record data using a number of different devices (e.g., camera, laptop, paper, and hand-held GPS), then abstract those data into one consistent record. The Hands-Off Sampling Device integrates several existing technologies to make capturing, cross-referencing, searching, and archiving the collection data much easier. The LANL Hazmat team has field-tested the Hands-Off Sampling Device and will soon demonstrate it to the U.S. Department of Defense (DoD). Additionally, LANL has built a smaller, less-detailed version of the sampling device with a grant from the U.S. Department of Homeland Security (DHS) and the State of California to enable the devices to be used for global avian surveillance. The devices will be deployed at bird banding stations around the world to track potential outbreaks of avian flu.

The Hands-Off Sampling Device is funded by the DoD Center for the Commercialization of Advanced Technology (CCAT). For additional information, visit www.lanl.gov/orgs/tt/license/techs/handsoff_sampling.shtml.

Photo courtesy of Los Alamos National Laboratory

THE RESPONDER KNOWLEDGE BASE

RKB Provides Access to Training Courses and Programs

The Responder Knowledge Base (RKB) gives access to an enormous amount of information. The information most often requested is found in the Products, Grants, and Authorized Equipment List (AEL)/Standardized Equipment List (SEL) sections. However, there is a great deal of valuable information to be found in the Other Content section of the RKB.

One content category found in Other Content is Training. To view RKB records related to training, scroll over the blue "Other Content" tab at the top of the RKB screen and click on "Training." RKB will return courses on products provided by manufacturers, emergency response-related courses added by training organizations, and even U.S. Department of Homeland Security (DHS)-sponsored programs.

To perform a search for a specific training record, users can type a word or phrase into the "Keyword Search" box at the top right-hand corner of the RKB homepage. A menu of search results, organized by content category, will appear on the left side of the screen. If there is a training record associated with the keyword, a link to it will be found in the Training category.

Each training record on the RKB describes the training's target audience, recommended level of expertise, course duration and format, prerequisites, and cost. RKB also provides contact information for users who want to obtain enrollment information directly from the training provider.

For more information, visit www.rkb.us. For questions or suggestions, please e-mail the RKB at RKBMailbox@us.saic.com or call 1-877-FEMA-RKB (1-877-336-2752).